



CREATE IN 3-D!

Google Sketchup 2014

Sketchup is a free 3-D model design software application used to create 3-dimensional digital assets that can then be animated, viewed, or used for 3-D printing.



Required knowledge...

Basic MS Windows / PC operation knowledge
Knowledge about basic geometric shapes, such as rectangles and polygons

Helpful knowledge...

Digital graphic/photo manipulation
3-D printing process (if model is to be printed)

If Sketchup is not currently installed on your computer, you can download it for free at this address:

<http://www.sketchup.com/>

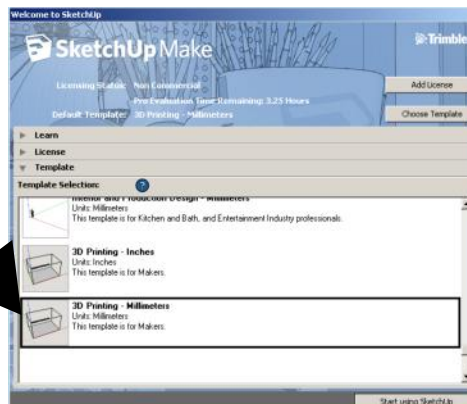
Once downloaded, double click the file to begin installation. Follow the on-screen installation instructions until finished.

The best starting spot to learn how to use this software is the “Getting Started” tutorial videos. Watch them at:

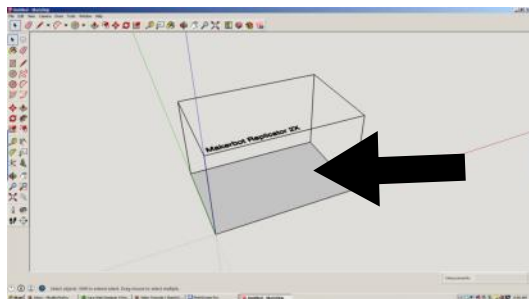
<http://www.sketchup.com/learn/videos>



Once you open Sketchup, you'll be greeted by the startup Splash screen. You need to choose a template to work off of - so click “Template” to reveal the choices.



If you're creating a 3-D print, the best template to choose is the “3D Printing Millimeters” template. Select it and click “Start Using Sketchup” at the bottom.

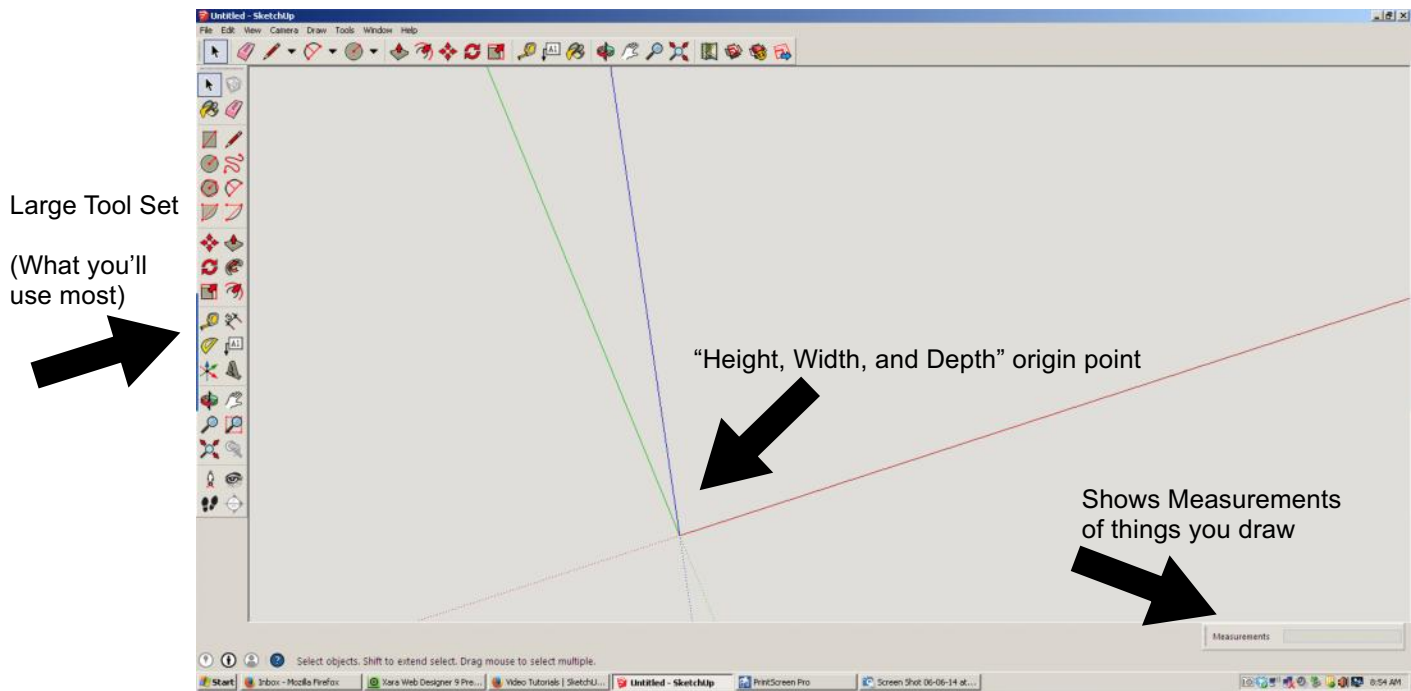


You'll see the template loads a virtual version of the 3-D printer. Go ahead and click the “Makerbot” box and press the delete key.

That gives you a clean working space to start with.

Go ahead and at the top command bar, choose “View / Toolbars” Select “Large Tool Set” to turn on the tool buttons seen here on the left side of the screen.

Your Work Area



Sketchup works by drawing basic shapes and building other shapes off of the previously created shape. Let's start by creating a simple cube.

Find the rectangle tool on the left Large Tool Set bar. Click it and move the cursor to the origin point.

Click the origin and draw a square.

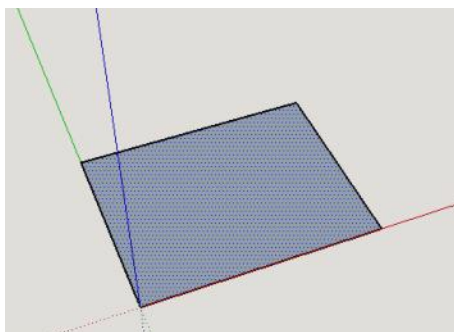
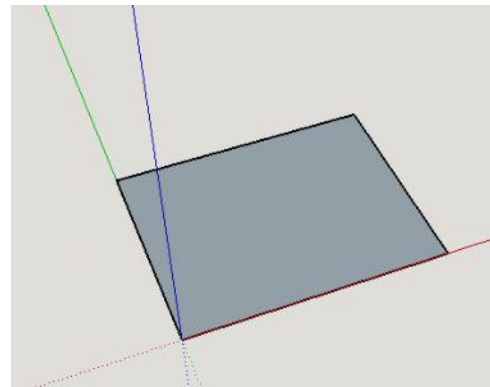


Your end result should look something like this.

We've drawn a 2-dimensional rectangle. It's a flat surface that has no height.

So, let's "extrude" this shape - which means to make it 3-dimensional.

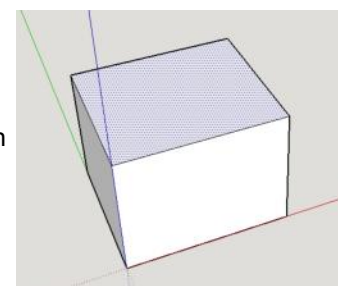
Click the "Extrude" button on the Large Tool Set.



As you roll the mouse over the rectangle, you'll see that it turns to a shaded pattern. That means you're ready to extrude this flat surface. Click and drag up and you'll see your rectangle turn into a dimensional object!

You can specify exactly how many millimeters you want to build up by simply clicking the flat surface with the extrude tool and typing in the millimeter number.

You'll see that number appears at the bottom right of the screen.

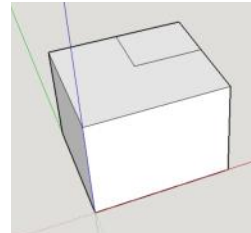


Now, let's add another shape to our model. You can use the "Line drawing" tool to create shapes.



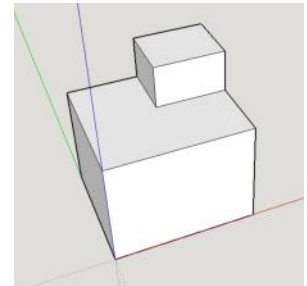
Click the pencil tool and move over to the top of your cube.

Click to draw 2 lines to create a smaller rectangle on the top of the cube as pictured here.

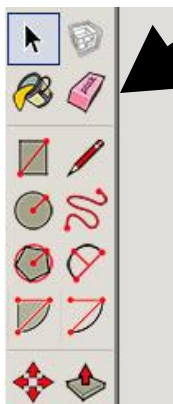


Now, click the Extrude tool and click and extrude your newly drawn rectangular area up.

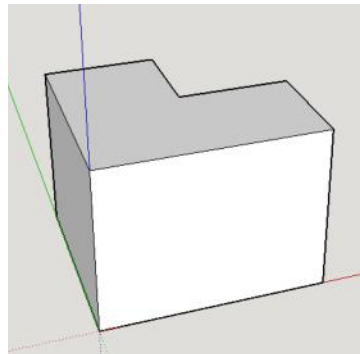
Your results should look like this...



If you make a mistake, that's alright. You can always choose "Edit / Undo." You can also use the eraser tool to doctor up your model. The eraser tool will erase edge lines.



Let's erase the extension at the top we just created. Click the eraser tool and click the lines that make up the edges of the extra cube we just created.



Oh no! As we erased the lines of the top rectangular object, we erased part of our original cube.

Let's get a better look at what we did.

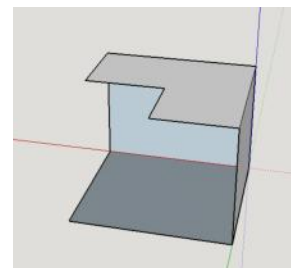
You can change your view of the object using several tools.

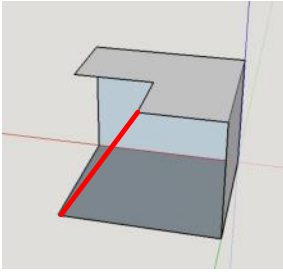
Choose the orbit tool from the lower part of the Big Tool Set. This permits you to click and drag around your model, rotating your viewing position so you can see all the sides.

Rotate around so we can see the area that's missing on our cube. Use the mouse wheel to zoom in or zoom out on your object.



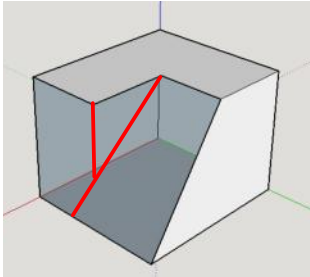
You can now see that we erased edges that were part of the original cube. You'll note that the areas on the "interior" of the cube are a little differently colored than the outside of the cube. To 3-D print, you can't have any of these "interior" faces showing from outside the model. Let's go ahead and use the pencil tool to draw some lines to connect the faces back together.



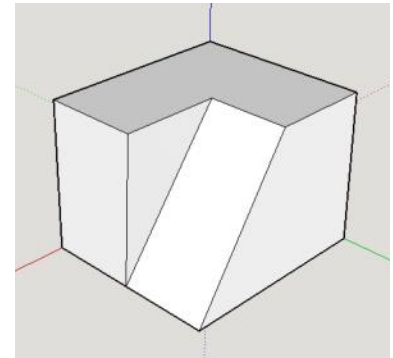


Draw a line like the red one illustrated here. Be sure to draw from one corner to the other.

Once you have drawn this line, you'll see Sketchup automatically creates a new "face" on this side of the object.



Go ahead and draw 2 more lines, as pictured here. Once complete, you'll see that we now have a solid object again, with no "interior" faces showing at all.



There's so much more to learn about Sketchup! You continue to build your 3-D object by drawing and extruding more and more objects. You can create circles, polygons, or arcs using tools in the Large Tool Set.

There are also tools that let you resize objects, rotate objects, and draw guidelines to help you create.

Explore tutorials online to refine your Sketchup skills. The more you use it, the better you'll get.

Once your object is complete, you can use "File / Export" to save a 2-D graphic of your creation, or export a 3-D model that can be used by animation programs or for 3-D Printing.